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Insurers: Too Many, Too Few, or "Just Right"?

Initial Observations on a Cross-Country Dataset of Concentration and Competition Measures

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Abstract

In many markets, industry and policymakers agree that there may be too many insurers. In others, the consensus is that there could be benefit from more competition. But this broad consensus is often supported by evidence that is more qualitative, anecdotal, or judgmental despite being unanimous. What is less clear, however, is how far consolidation or liberalization will go, how fast, and when it will end. This paper presents some initial observations from a cross-country data set and proposes that individual country results can be interpreted against this data set to inform expectations regarding trends in competition, concentration and consolidation, to inform analysis of the sector, for individual firm strategic planning and wider market risk assessments. A "natural level" for measures is suggested as a starting hypothesis. Further consideration is then made of the role of absolute market size, stage of market development, and differentials between life and non life segments. Analysis of the natural level, adjusted for market conditions, can then be used to develop preliminary views on current and expected market dynamics, strategic planning, and to inform policy, regulatory and supervisory priorities.

This paper—a product of the Finance and Private Sector Vice Presidency, Financial Systems Department—is part of a larger effort in the department to develop an understanding and diagnostic capacity to support country assistance and policy development in the financial sector. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at cthorburn@worldbank.org.

Insurers: Too Many, Too Few, or "Just Right"?

Initial Observations on a Cross-Country Dataset of Concentration and Competition Measures

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Key Words: Insurance Markets, Competition, Concentration, Herfindahl Index

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Glossary

Herfindahl Index	Refer Annex: The Herfindahl Index at page 23
Life Insurance	The insurance of mortality and, in some countries, morbidity (disability and disablement) risks associated with the existence or continuation of human condition.
Non Life Insurance	Insurance other than life insurance, normally against the loss or damage to property or the arising of liability to others. It is usual that non life insurance is of a shorter term in nature than life insurance events.
Insurance Penetration	The ratio of written premium compared to the gross domestic product of the same market.

Insurers: Too Many, Too Few, or "Just Right"?

Initial Observations on a Cross-Country Dataset of Concentration and Competition Measures

Introduction and Motivation

In many markets, industry and policymakers agree that there may be too many insurers. In others, the consensus is that there could be benefit from more competition. But this broad consensus is often supported by evidence that is more qualitative, anecdotal, or judgmental despite being unanimous. What is less clear, however, is how far will consolidation or liberalization go, how fast, and when it will end. Is there some indication of the more natural level of competition and market composition? In a consolidating market, how many companies will remain after the process ends? When liberalizing, how many companies might be the result and how many applications can the new supervisor expect to have to deal with?

"Too many insurers" can be undesirable for shareholders, policyholders and supervisors. Companies struggle to achieve economies of scale and long-term sustainable returns on equity. In pursuit of market scale, irrational price wars break out further eroding returns to shareholders and risking the financial security of firms. Policyholders ultimately pay through reduced product value and the limited ability for firms to invest in innovation so as to provide solutions to fully meet customer needs. In the extreme, companies could fail due to inadequate prices and claims are not paid. Expectations for growth in the overall market may justify continued market participation in the short run but it is also likely that merger and acquisition activity will achieve economies more quickly. Companies will be looking to gain market advantage through stepped change in scale. Regulation, in such situations, needs to ensure the pathway to change of control is clear, transparent, and available. A full range of intervention tools needs to be available to watchful supervisors. New market participants are more likely to enter through acquisition unless they have a distinct and unique business model or some other specific reason.

"Too few insurers" can support inefficient operations. Management and shareholder comfort with returns may provide limited incentive to invest to develop technical capacity with the consequence that risk management and product innovation lags behind more dynamic markets. Opportunities for new entrant 'green-field' startups can become attractive. In the event that strategic direction is also less than fully dynamic then, combined with an absence of technical capacity, prudential risk will increase particularly when new entrants put existing market participants under competitive pressure.

In some markets, the starting point is a monopoly insurer facing a liberalizing market. When markets are liberalized, supervisors, regulators, and existing company management and owners are interested in understanding what will be the reasonable expectation for

the future. Will there be many new licenses to consider? Will the former monopoly company market share erode slowly or fall quickly?

This note takes a first step toward understanding the behavior of market share based measures by preparing a cross country data set and presenting some relatively preliminary and fundamental analysis of the data recognizing that such comparisons are not available in existing literature. Further analysis is proposed as part of the next steps. This paper has been prepared to act as a reference for other analysis and to prompt discussion on further developments.

The information on the data set can be used as part of the analysis of insurance markets by country authorities, policymakers, market participants and observers. Conclusions may contribute to risk analysis efforts, strategic planning, and to assist in prioritizing actions[2].

The Data Set

The data set covers several measures regarding concentration and competition from two data sources supplemented with additional calculations[3]. The data set was originally collated to examine and benchmark Herfindahl Index trends and levels separately for life and non life insurance as categorized in the source data. It has been supplemented by market shares of the largest company, top three companies, and top five companies so as to examine how change impacts on the larger players separately[4]. An estimate of numbers of companies was made from the tabulated data[5]. As a measure of market development, insurance penetration (written premium to GDP) is included; and as a measure of absolute market size, total premium in $US millions is included.

It has to be accepted that definitions of premium by class (life and non-life) will differ from country to country. Premium and market size measures will also be influenced by the role of the public sector in risk provision, for example, through the size and nature of the national social security scheme, and the extent that public sector agencies provide insurance for motor and workplace injury. However, it is suggested that these measures can be used if they are interpreted as "broadly indicative" of trends and levels.

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[2] For example, in the case of supervisory and regulatory reform agendas, a liberalizing market suggesting more market entrants would imply attention to licensing regimes and processes and other market entry criteria whereas a consolidating and intensively competitive market could suggest priority be give to any weaknesses in transfer and amalgamation, acquisition, and wind up provisions.

[3] The data are sourced primarily from AXCO for market share data, company numbers, premium size, and exchange rates. Swiss Re Sigma was sourced for data on insurance penetration (premium to GDP) by country. (See Annex: References for more information)

[4] Although the Herfindahl Index is a function of market shares, these other figures are also widely cited particularly by analysts who do not make use of the Herfindahl calculation.

[5] In some cases, the number of companies has been estimated based on the number implied in the standard table prepared from the source data set and the addition of the "other" group at the minimum number implied. As such, the result will not be, in all cases, equal to the actual number of licensed companies in the market. In addition, companies that are recorded with a zero premium are treated as not being in this value.

Overall, the data set covers various observations from 1991 to 2006 for a range of countries. Not all data points are available for all years for all countries and complete for all measures. Most observations reflect more recent years.

There are 385 life and 391 non life index values in the data set including several cases where a state monopoly exists. The average number of observations is around 3.3 readings per country for each of life and non life insurance data sets. The average value for the Herfindahl Index is notably higher for life insurance than non life insurance (refer Table 1).

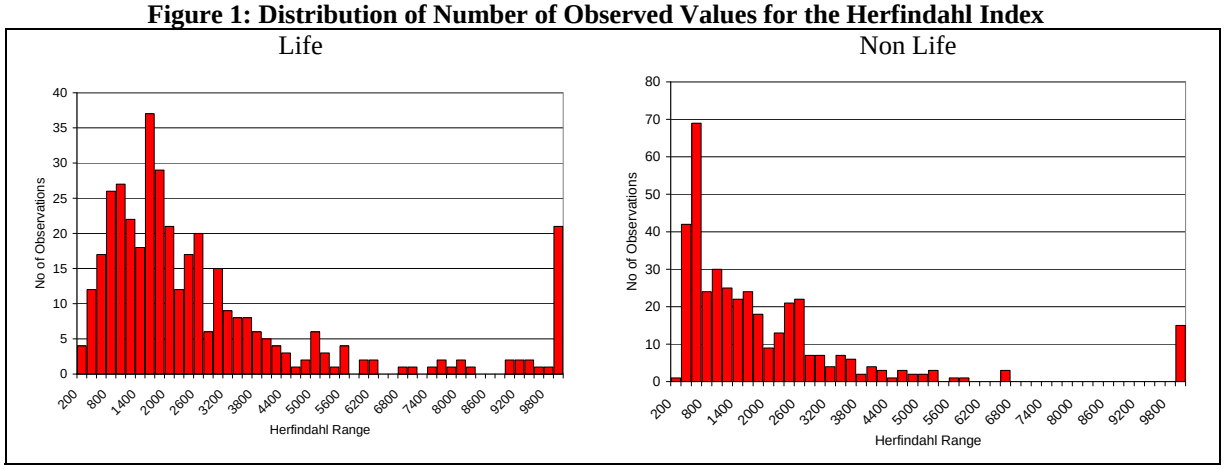
Table 1: Data Set Herfindahl Observations

	No of Observations	No of Countries	Average	Standard Deviation	Maximum	Minimum
Life						
- complete	385	116	2,687	2,506	10,000	110
- excluding monopolies	364	111	2,265	1,836	9,768	110
Non Life						
- complete	391	119	1,856	2,023	10,000	135
- excluding monopolies	376	113	1,531	1,223	6,590	135

Source: Staff Analysis

The fuller distribution of values in the data set is seen in Figure 1.

Figure 1: Distribution of Number of Observed Values for the Herfindahl Index



Source: Staff Analysis

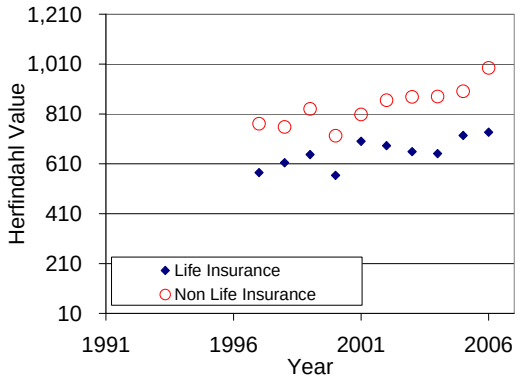
Observations on the Herfindahl Index

Is There a Natural Level for the Index?

Taking a number of examples where there is a longer history available suggests that lower than average values are followed by an increasing trend and higher values gradually reduce. In other words, the indication from inspection is that there may be a

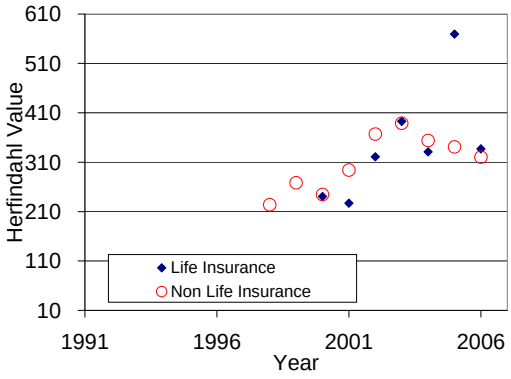
natural level of competition in markets and that each market moves toward this natural level. In both cases, the progression is potentially slower than some market participants facing change may expect. Radical change is unusual. More gradual and organic change is the norm particularly with respect to consolidation cases. After an initial two year period following liberalization, progress is also more organic than dramatic (see Figure 2 for several individual country trend examples).

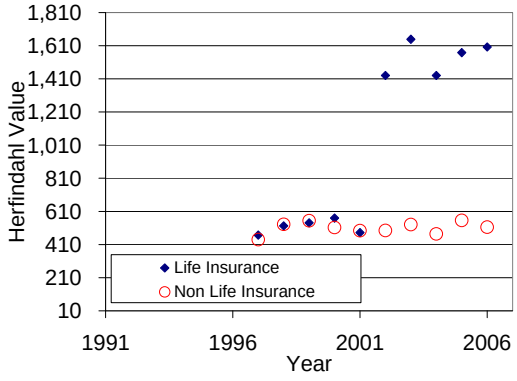
Figure 2: Progress of Country Data Series where longer trends are available



In Chile, both indexes are lower than average and show a gradual increase over time.

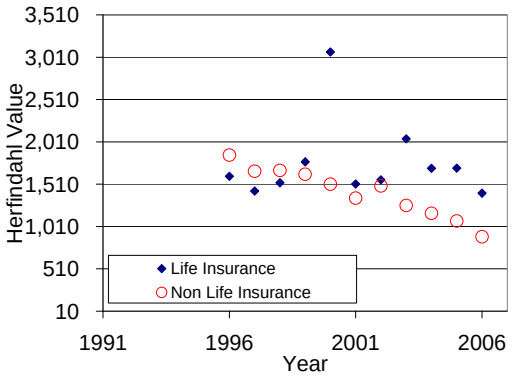
In Argentina, progressive increases from very low levels are evident albeit that the non life sector has seen the index reduce more recently.

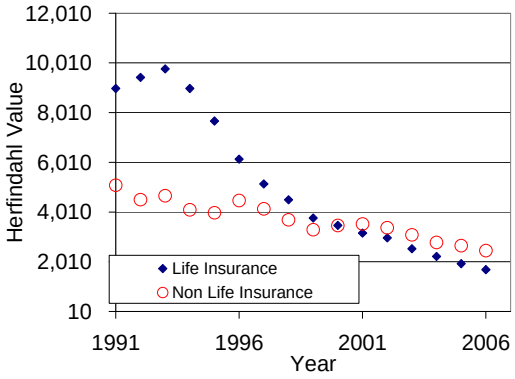




In Brazil, the non life sector has remained persistently diverse whereas stepped change in the life sector is evident as it moves toward levels closer to data set averages.

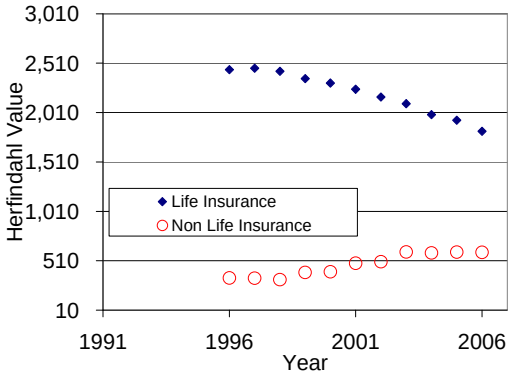
In Mexico, the non life sector was showing levels higher than the data set average and progressively moved toward the data set average. For the life sector, a sharp increase to levels above average was quickly reversed and more recent stability is close to the data set average.

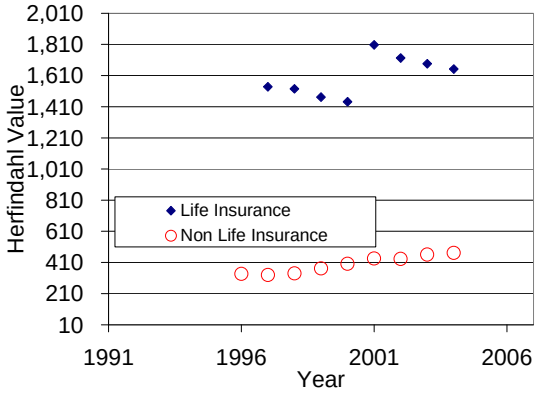




In Poland, with the longest history in the data set, the move from a monopoly situation to the overall average is clear. For non life insurance, the sector liberalization over the period has also seen levels moving toward the data set average.

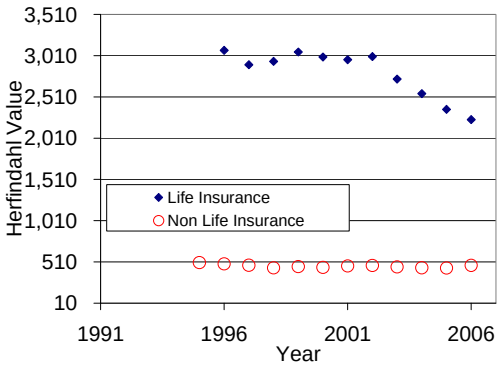
In Singapore, both trends consistent with the hypothesis are obvious. The life sector gradually sees the index fall and the non life sector sees an increase from very low levels.

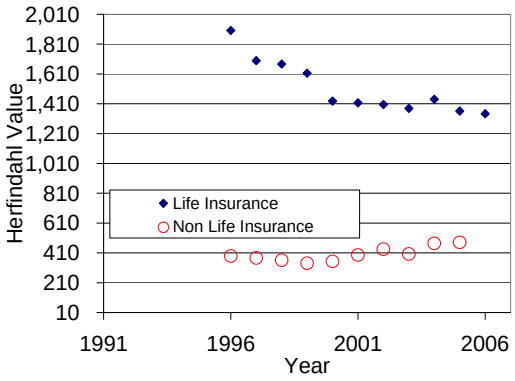




In Malaysia, both levels are below the data set averages. Increases have been more organic in the non life sector. In contrast, the life sector has seen drift in the measures with a step change in a single year.

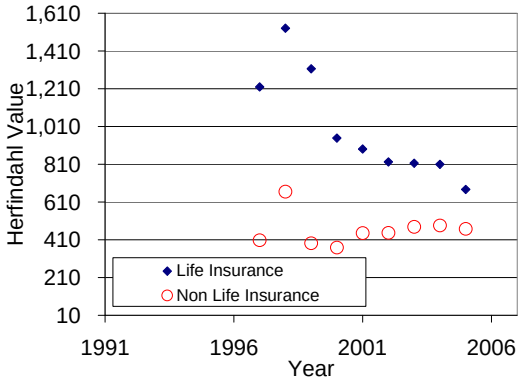
In Thailand, the life sector has reverted to data set averages recently. The non life sector has seen flat Herfindahl values despite being at lower than average levels.

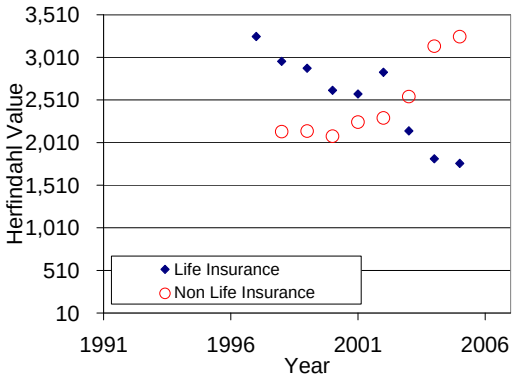




In the Philippines, the life sector has reduced to levels now below the sector average and then remained stable. For the non life sector, after a period at particularly low levels, gradual increases are starting to be recorded.

In Indonesia, both sectors have been persistently below the data set average. The life sector reduction is, therefore, counter to the view that the direction of change would be toward the data set average but the non life sector has shown some tendency to increase.





In Egypt, the life sector has fallen in line with the hypothesis that movement would be toward the data set average whereas the non life sector has seen increased concentration to levels somewhat counter to expectations.

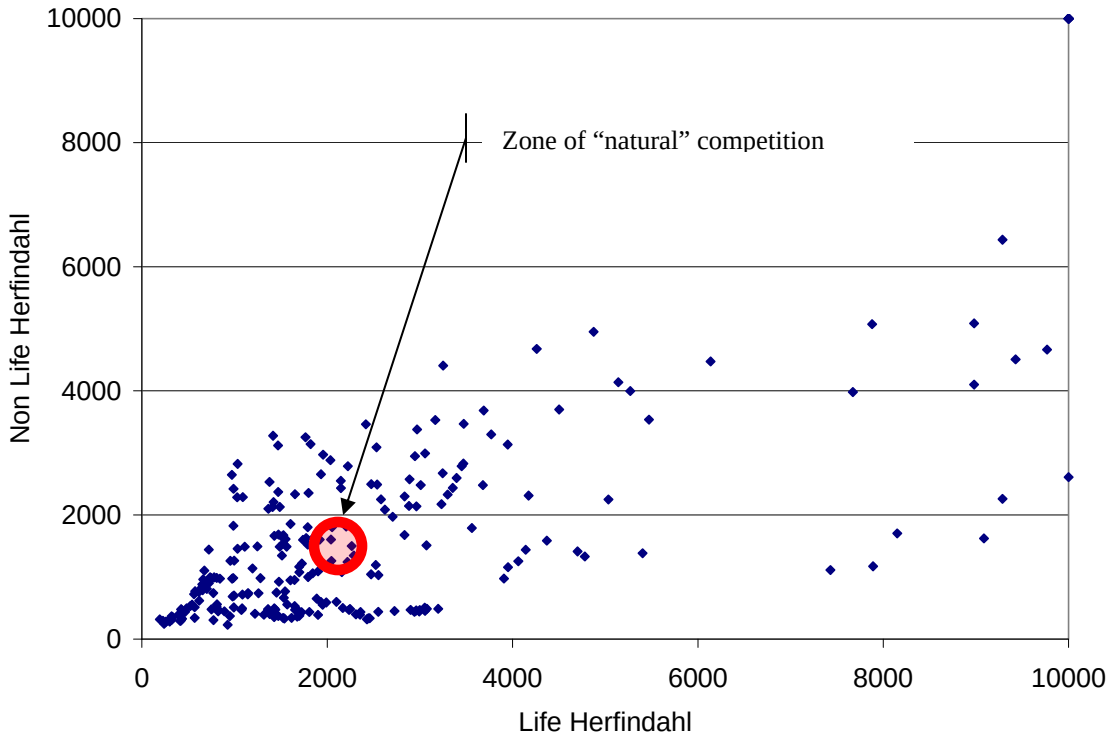
Source: Staff Analysis

As a result, an initial proposition based on these individual cases and the wider data set would be that a market where the Herfindahl Index observation is above or below the

more general level would be expected to gradually move toward this more natural level. The level for life and non life sectors for the index is different. Overall, the average for the data set suggests that a “natural level” is closer to the data set averages around 2,000 to 2,200 for life insurers and 1,200 to 1,500 for non life insurers.

Most markets are not at the “natural level” suggesting that M&A activity or liberalization is to be expected in many cases. Almost all markets are “in transition” so face challenges to be monitored, understood, and taken into account in setting policy and recognizing prudential challenges in a risk based setting (refer Figure 3).

Figure 3: Non Life Herfindal v Life Herfindahl with "zone of natural competition"



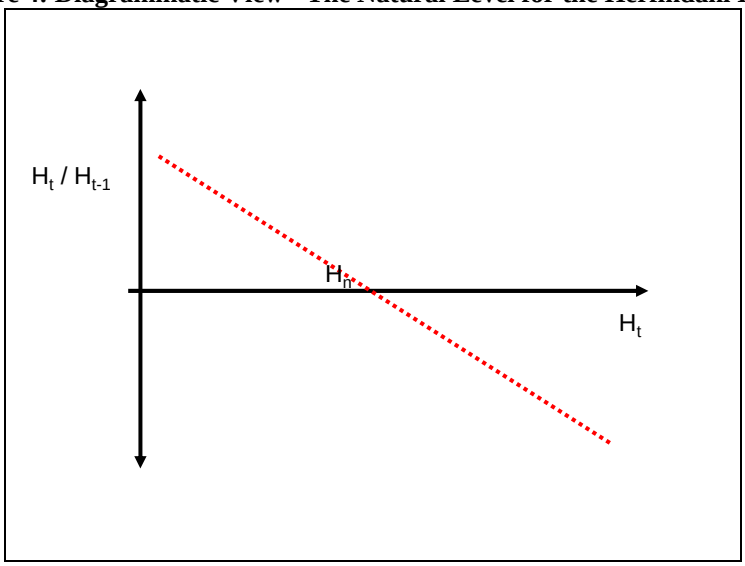
Source: Staff Analysis

This hypothesis of a natural level has been tested in field discussions where the views of market participants were sought on the validity of the starting hypothesis and the consequent implications for interpreting their own market competitive dynamic. It has been consistent with market participant views. Where consolidation is indicated and fierce competition coupled with the desire for growth from smaller players to achieve economies of scale is suggested or where gradual falls in market share and potential new entrants is suggested, market participants have concurred with the hypothesis suggested from the data set.

Does the Data Set Support the Hypothesis Further?

It would be possible to examine the change in the index value from year to year. The hypothesis would suggest that, above the 'natural' level, say H_n, the value of H_t / H_{t-k} would be less than 1 reflecting a progressive move to lower index levels over time and increased competition. Below the natural level the value of the ratio would tend to be greater than 1 as the index progressively increases as the market consolidates. This is diagrammatically represented in Figure 4.

Figure 4: Diagrammatic View - The Natural Level for the Herfindahl Index



Source: Staff Analysis

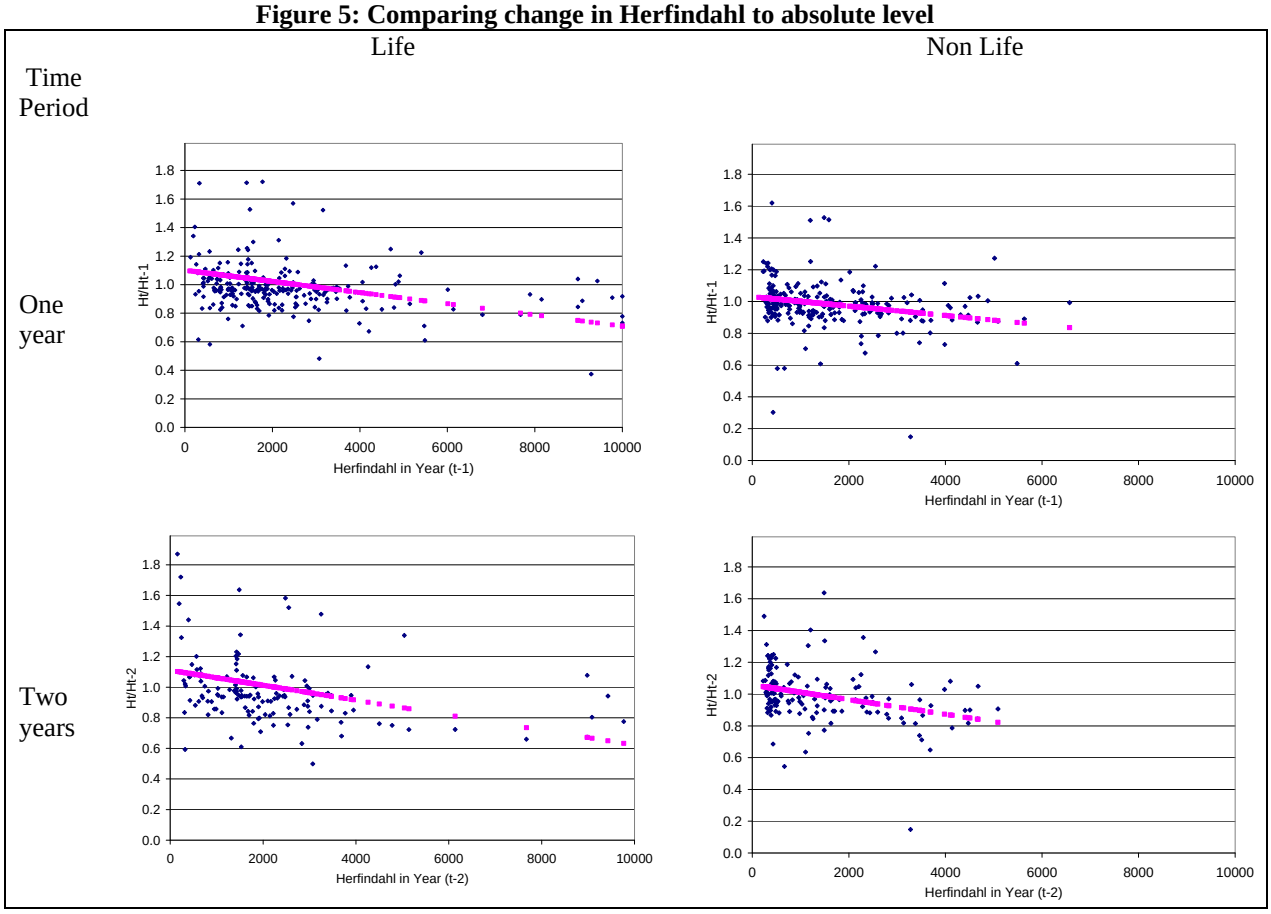
The data has been examined for both one year and two year periods excluding monopoly cases (values of k in the above representation of one and two). Regression lines were fitted to minimize residuals and, in all cases, show the slope expected. Further statistics relating to the regression are shown in Table 2. The observed values and fitted lines are shown in Figure 5.

In all cases the slope of the fitted line is negative. The confidence intervals suggest that the slope is statistically significant in all cases. That is, a slope equal to zero and no evidence of a natural level tendency in the data set is *not* supported by the analysis.

The trend line crosses the axis (where H_n is indicated in Figure 4 so the ratio value is equal to 1) at around 2,400 to 2,800 for life insurance and between 1,350 to 1,450 for non life insurers depending on the one or two year time frame tested.

At the same time, validation against industry participant experience seems useful. The hypothesis and the data reflect a wide data set and the conditions in each individual market may have local characteristics and explanations best known to local participants.

Figure 5: Comparing change in Herfindahl to absolute level



Source: Staff Analysis

Table 2: Statistical Summary of Results of Regression Lines Comparing Ratios of Herfindahl Indices

Case	Dependent Variable	Constant	Slope			r^2
			Value	Upper Confidence Interval	Lower Confidence Interval	
Life	H_1/H_0	1.111023	(0.000039)	(0.000030)	(0.000049)	3.35%
	H_2/H_0	1.120544	(0.000049)	(0.000039)	(0.000059)	7.37%
Non Life	H_1/H_0	1.040083	(0.000030)	(0.000024)	(0.000035)	5.10%
	H_2/H_0	1.067595	(0.000046)	(0.000038)	(0.000054)	10.77%

Note: Confidence intervals shown are calculated on the basis of a two sided 95% probability.

Source: Staff Analysis

Does Market Development Phase Make a Difference?

This section investigates whether variation between countries may also be reflective of the stage of development of the market. In the early stages of development, it could be argued that either more or less participants would be expected or that competition is

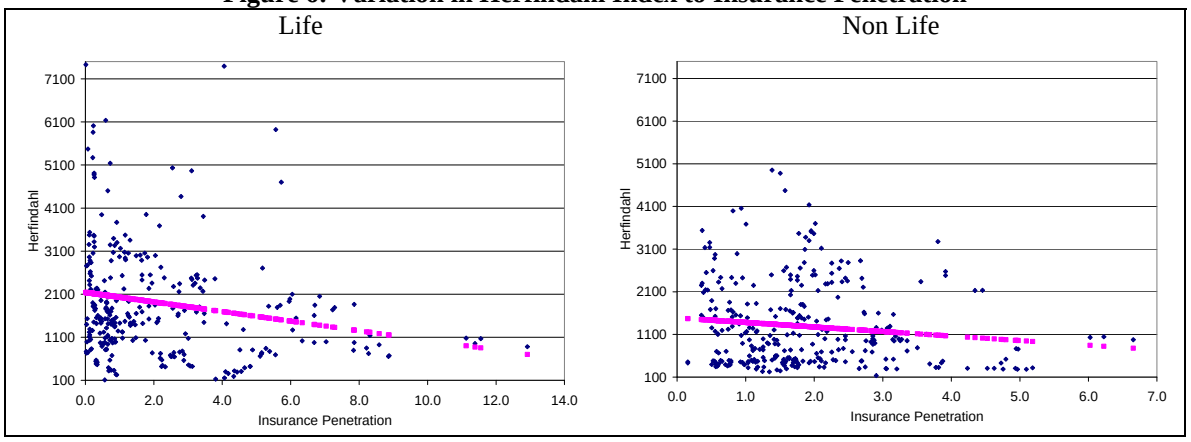
influenced by lower levels of financial literacy and a market that is smaller in size relative to the economy generally. More mature markets have a wider range of products and services and a greater tendency in the population to utilize insurance services, providing opportunities for more market participants, some specialists in particular product lines, and a more readily accessible pool of operational staff.

Figure 6 presents the plot of insurance penetration, premium expressed as a percentage of gross domestic product, compared to Herfindahl Index values. Table 3 provides the results of the fitted regression lines that are also shown on the charts.

Overall, although the trend line is able to be generated, the explanatory power of the insurance penetration measure appears to be limited, and particularly so in the case of non life insurance market dynamics. Even when the trend line parameters are considered, it is important to remember that the actual values for insurance penetration are not large in their own right so will have only a limited range of variation on the prediction of the Herfindahl Index. As such, the pattern appears to be inconclusive suggesting that the level of development does not materially impact the observed level of market competition.

One conclusion that is more apparent is that there are no cases where insurance penetration is high and the Herfindahl Index value is high as well. This suggests that less liberalized markets are not consistent with increased utilization of insurance products.

Figure 6: Variation in Herfindahl Index to Insurance Penetration



Source: Staff Analysis

Table 3: Statistical Summary of Results of Regression Lines Comparing Penetration to Herfindahl Indices

Case	Constant	Slope			r^2
		Value	Upper Confidence Interval	Lower Confidence Interval	
Life	2147.986	(111.471)	(71.228)	(151.714)	3.29%
Non Life	1492.141	(106.654)	(51.483)	(161.826)	1.48%

Note: Confidence intervals shown are calculated on the basis of a two sided 95% probability.

Source: Staff Analysis

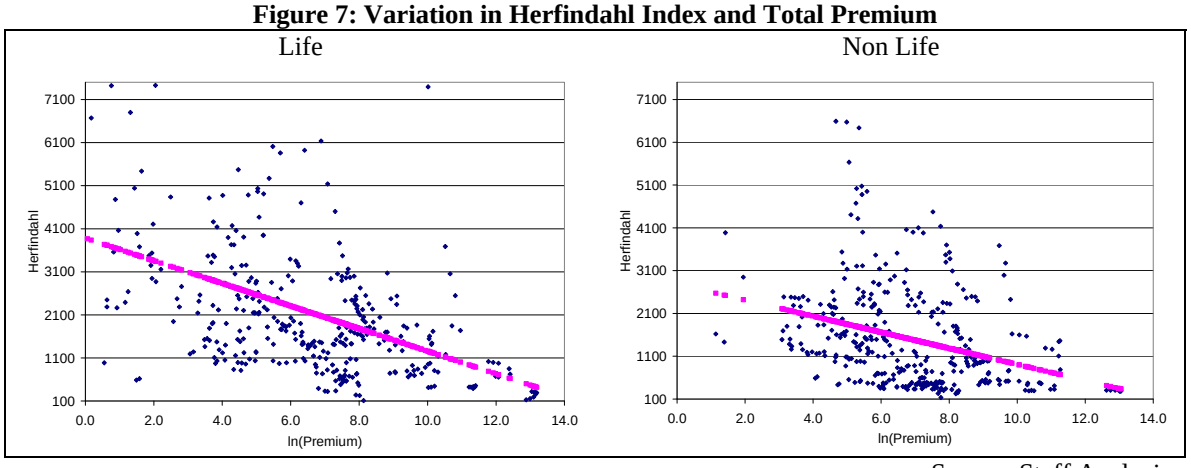
Does Market Size Make a Difference?

An *a priori* view that markets will consolidate and company numbers will reduce may be mitigated by the view that the market has the potential, instead, to grow in size. As the size of the market increases, then it can accommodate more market participants whilst still providing the access to economies of scale that they are seeking. In such an environment, organic growth albeit with lower than otherwise acceptable market share values, might be a more effective strategy than seeking growth through acquisition and merger.

That said, observing that higher index levels are not found in larger markets and that smaller markets tend to be more concentrated, it would seem more speculative to advance the view that market size is a result of the competitive settings.

Figure 7 suggests that lower index values can be supported in larger markets measured in terms of absolute size. The regression lines fitted (refer Table 4) also support the relevance of absolute market size as a factor that contributes to interpreting observed concentration measure values and speculating on their future direction.

Figure 7: Variation in Herfindahl Index and Total Premium



Source: Staff Analysis

Table 4: Statistical Summary of Results of Regression Lines Comparing Premium to Herfindahl Indices

Case	Constant	Slope			r^2
		Value	Upper Confidence Interval	Lower Confidence Interval	
Life	3894.763	(262.545)	(237.274)	(287.816)	20.20%
Non Life	2795.412	(187.774)	(165.958)	(209.591)	11.17%

Note: Confidence intervals shown are calculated on the basis of a two sided 95% probability.

Source: Staff Analysis

What Does a More Formal Regression Analysis Suggest?

The above discussion suggests that the observed index value may be a function of five factors to a greater or lesser extent:

- the natural level for the index, all other things being equal;
- the subsector is being examined: Life or Non Life Insurance;
- the size of the market in absolute terms;
- the level of development of the market measured by the insurance penetration proxy; and
- the actual status of competition or concentration in the market.

To consider this, a multiple linear regression approach has been tested. To cater for the observed differences between life and non life markets, the analysis has been completed for each segment separately. To measure the size of the market, the logarithm of the premium in millions of $US has been used (*ln(P)* in the formula). Market development is proxied by the insurance penetration measure (*I* in the formula). In addition, to consider the effect of the progressive move toward the natural level noted above, a term equal to the difference between the prior year index value and the sample mean is included. This final term reflects the expectation that the transition is somewhat organic. Finally, an error term is included in the usual statistical description.

The resulting model to be fitted is shown in Equation 1 although it was also fitted without the term for the adjustment toward the normal level ('*d*' in the equation) for comparative purposes. The first term provides the natural starting point, the next three terms provide the reference to the "market size and development", and the fifth term provides for the pace of consolidation/liberalization.

$$H_t = \{H_n\} + \{a + b\ln(P) + cI\} + \{d(H_{t-1} - H_n)\} + e$$

Equation 1

The results of this construction are promising. The suggested natural levels in line with the average values observed were separated from the market size and directional terms and produced very high explanatory results (refer Table 5). Even without the autoregressive character of the model then the explanation is useful but, with the characteristic included, over 97% of the variation in the data set is explained. Even without the explanation provided by the fact that markets are transitioning in the right direction, the balance of the model is still usefully explanatory and provides a guide to the ultimate level in a neutrally competitive situation for a given market. The suggested interpretation of a Herfindahl reading can, against this proposition, be made with a comparison against the "natural level" adjusted for "market size and development".

Market size appears material for both life and non life markets. Larger markets support lower levels of the index consistent with the view that the economies of scale are available without the same level or pressure for consolidation to achieve them. In larger markets, there is more opportunity for specialization at cost effective rates in both

product offering and other business elements such as distribution or geographic specialization. As a result, more participants are able to occupy the market compared to smaller markets where the economies of scale can only be achieved by participating more generally in the whole market.

Market development measured through penetration appears most relevant for life markets and less so for non life markets. In the multiple regression, less developed markets have higher natural concentration levels after allowing for market dynamics – a result that is more consistent with expectations.

The pace of organic consolidation or liberalization is also suggested as being around 9 years given the resulting values for the adjustment parameter '*d*'. This gives an indication of the rate at which larger players will see their market share erode in a liberalizing case, and that business combinations can be expected to reach their ultimate outcome in the absence of other external encouragement in consolidating cases.

Table 5: Multiple Factor Regression Results

Item	Life Insurance Case		Non Life Insurance Case	
	Without Market Reversion	With Market Reversion	Without Market Reversion	With Market Reversion
Natural Level				
H_n	2265.215		1531.420	
Market Size and Development Adjustment				
a (constant)	1274.404	159.915	773.650	145.384
b (*ln(P):* Premium)	(242.713)	(43.634)	(136.999)	(28.240)
c (Insurance Penetration)	56.912	34.685	6.520	1.629
Market Reversion Adjustment				
d (Adjustment toward natural level)		0.889		0.918
R^2	45.25%	97.89%	45.34%	97.65%
No of Observations	307	215	311	222

Source: Staff Analysis

Why Could Optimal Non Life Concentrations Be Lower Than Life Concentrations?

Economies of scale are more readily accessible for life insurers than non life insurers[6]. For example, where a life insurer adds a similar number of insurance policies of the same type then it can add them to the existing administrative systems and leave it at that – securing the benefit. For a non life insurer, the issue is more problematic. For example, each new policy cannot simply be added to the existing set without consideration of aggregation of risk and the need to realign reinsurance needs. For a life insurer, doubling

[6] That is, when growing a business, the marginal addition of life business secures economies of scale with little additional consideration whereas, for non–life business, the addition may be able to be accommodated administratively but will immediately need to be considered in the context of physical or other risk aggregation challenges in the context, for example, of the reinsurance program.

market share adds little risk as it probably improves diversification. Additional risks are not likely to be correlated materially with existing risks. For a non life insurer, adding additional risks may lead to increased concentration risk due to correlations of risk and ongoing underwriting processes require a more detailed consideration of underwriters, so there is, to an extent, less benefit for a non life insurer in increased size than is the case for a life insurer.

Overall, this hypothesis would suggest that the incentives for increased size are stronger for life than non life companies and would support the observation in the data set that the life insurance sector seems to have a higher level of concentration at the "natural level" than is observed in the non life sector.

How Might Individual Product Values Differ?

Within markets, individual product statistics will facilitate Herfindahl calculations. The data sources do not allow cross country comparisons of such data, however, it can be postulated that such values will be higher than the overall segment data presented here. This is because most companies can be expected to specialize in some but not all products in the sector. As a result, individual product index values would be expected to be "naturally" higher than the overall value ranges suggested here.

Observations on Market Share Values

What Can the Market Shares of Larger Players Tell Us?

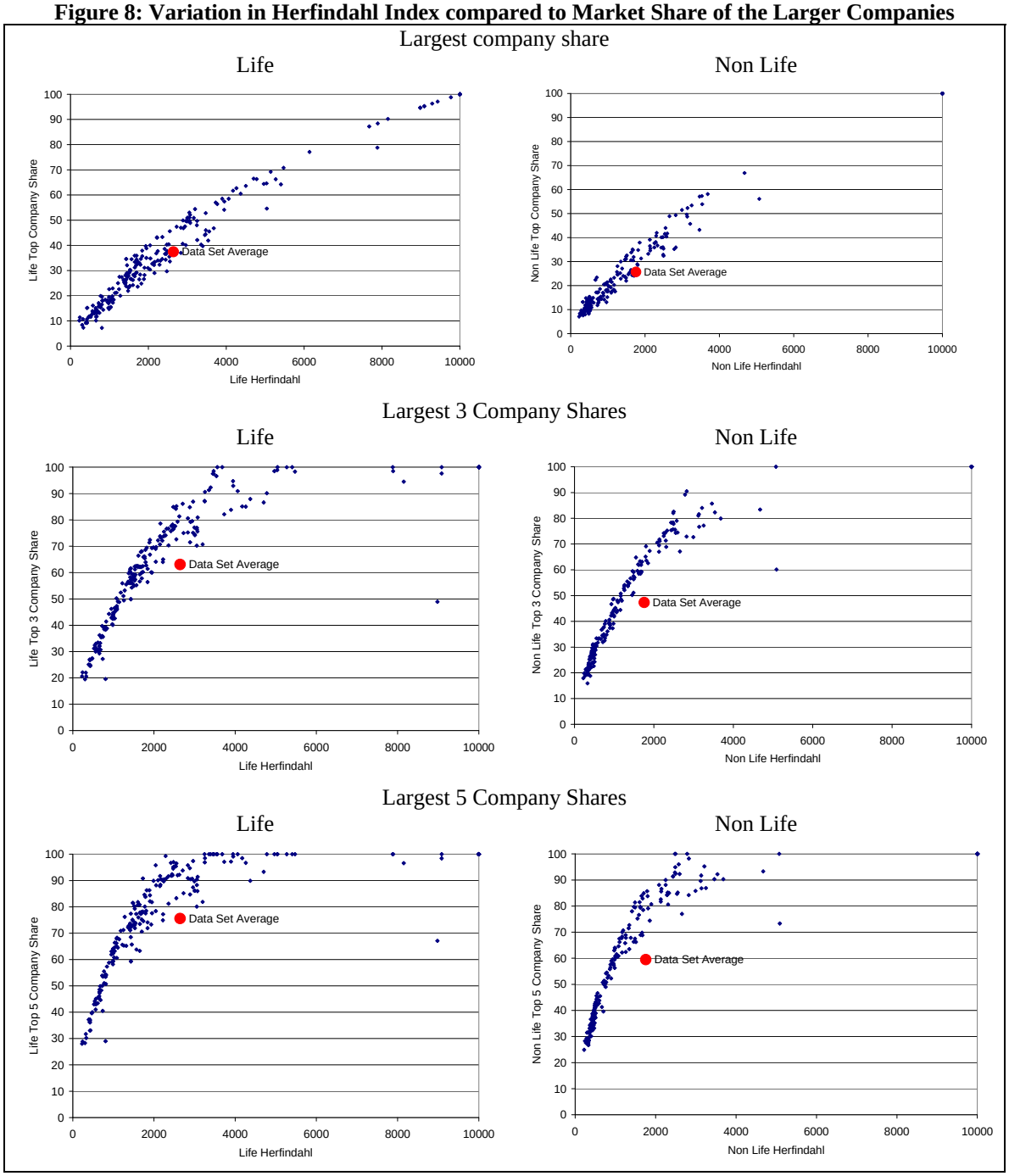
The larger company market shares are a key determinant of the Herfindahl Index level so it is not surprising that there is a clear relationship shown when larger company share measures values are displayed in charts comparing them to the overall index values (see Figure 8). However, it may be relevant to consider if the data set provides some guidance on the expectations of the larger firms. The observations may be particularly relevant to strategists within these firms but also for supervisors considering the risk profile and coherence of the strategy of that firm.

It is often expected (or feared) that the largest company will see market share fall dramatically and suddenly. The data set does not provide support for this proposition. Although falls are material, they would appear to be able to be managed if company strategists are able to develop plans taking into account realistic expectations.

The results for similar regression analysis of the market share statistics are included in Table 6 although, in these cases, no regression has been done to include the transitional variable. This work is proposed for a later stage. The results are consistent with the more general Herfindahl Index results above and could be used similarly to provide a reference of the natural level adjusted for market size for these measures. To that end, the results

would then provide some guidance as to the likely course for the largest participants in terms of their market share as the sector consolidates or liberalizes. That is, could they be expected to be participants in the consolidation or will it be largely limited to smaller participants merging between themselves? Would it be expected that the larger company shares will fall and to what extent in a liberalizing environment?

Figure 8: Variation in Herfindahl Index compared to Market Share of the Larger Companies



Source: Staff Analysis

Table 6: Regression Results on Market Shares of Leading Companies

	Data Set Average	Market Size and Development Adjustment			R^2
		a (constant)	*b* (*ln(P):* Premium)	*c* (Insurance Penetration)	
Top Company Market Share					
Life	34.141	15.297	-2.738	0.379	37.74%
Non Life	24.789	10.474	-1.668	-0.399	40.01%
Top Three Companies' Market Share					
Life	61.616	33.619	-5.706	2.045	44.01%
Non Life	49.343	23.641	-3.903	0.784	34.03%
Top Five Companies' Market Share					
Life	74.983	36.377	-6.169	2.503	45.48%
Non Life	62.525	27.865	-4.704	1.641	32.43%

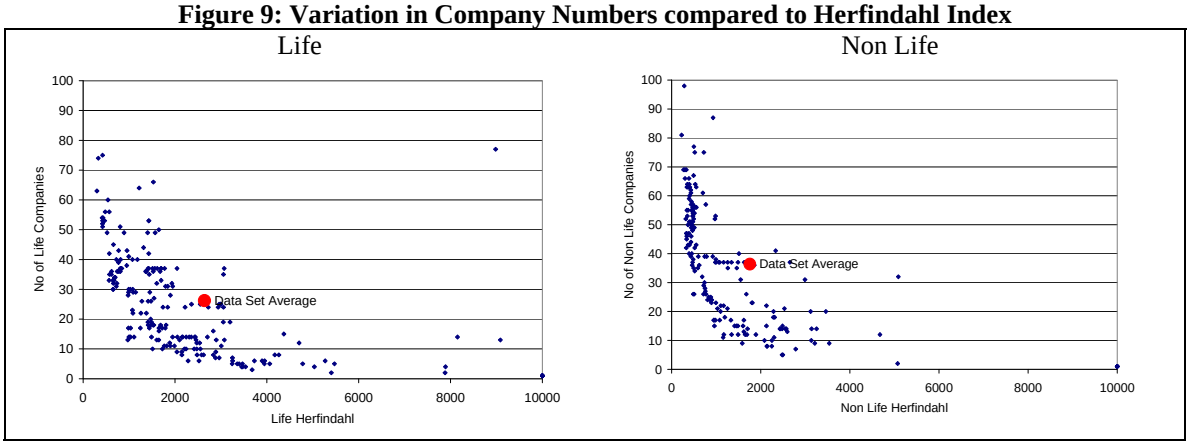
Source: Staff Analysis

Observations on Numbers of Market Participants

What Could Be the Natural Number of Sector Participants?

The above discussion on the Herfindahl Index can provide focus on the direction and pressures for change however, it may also be possible to consider the ultimate potential number of companies that the sector may see. As the index changes toward the natural level, the number of companies can be expected to change. Figure 9 presents charts of company numbers against the index in each sector and suggests that a curve could be fitted to the data. As a result, it would be possible to postulate that, for example, a country with 60 non life companies (as defined for the data set) would have an index around 400 and, as the index increases toward the natural level closer to 1,500 then this would suggest the company numbers should fall by around 25, ie a change of around 35 participants.

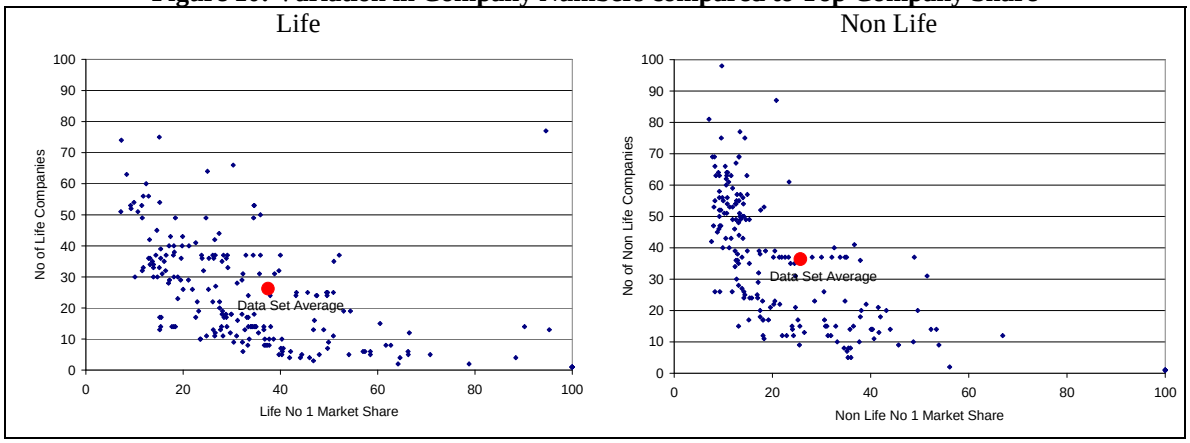
Figure 9: Variation in Company Numbers compared to Herfindahl Index



Source: Staff Analysis

As would be expected, the larger the shares of the largest company the fewer competitors that it usually faces suggesting a more limited the space for new entrants and existing competitors (refer Figure 10). However, this can be viewed differently. As the market moves to a more natural level then it can be considered that the largest player has a role in the process, expecting its share to reduce or increase toward the average level. That is, where there is a progressive liberalization underway then the eventual market share for the largest player has a floor, and where consolidation is expected then the local largest player can be expected to play a role in acquisitions to increase market share to the more "normal" level. That is, as the number of companies fall the share of the largest company rises. It is clear that the largest participant does participate in industry consolidation in most circumstances.

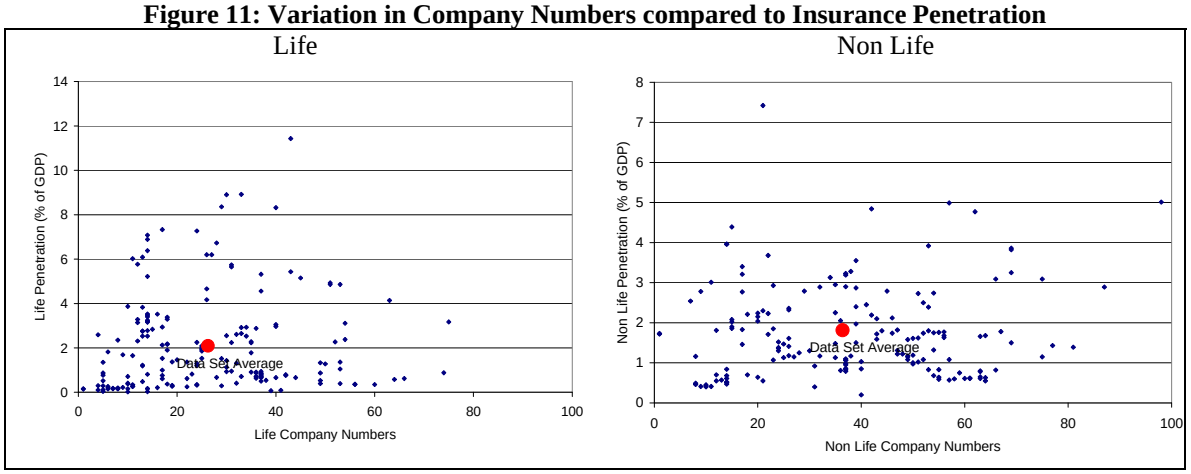
Figure 10: Variation in Company Numbers compared to Top Company Share



Source: Staff Analysis

Investigating variation in company numbers against the insurance penetration measure would give insight into whether or not the state of market development makes a difference to company numbers. Figure 11 is inconclusive but consistent with the view above that the penetration is not a good indicator of either the Herfindahl Index or the role of the largest firm.

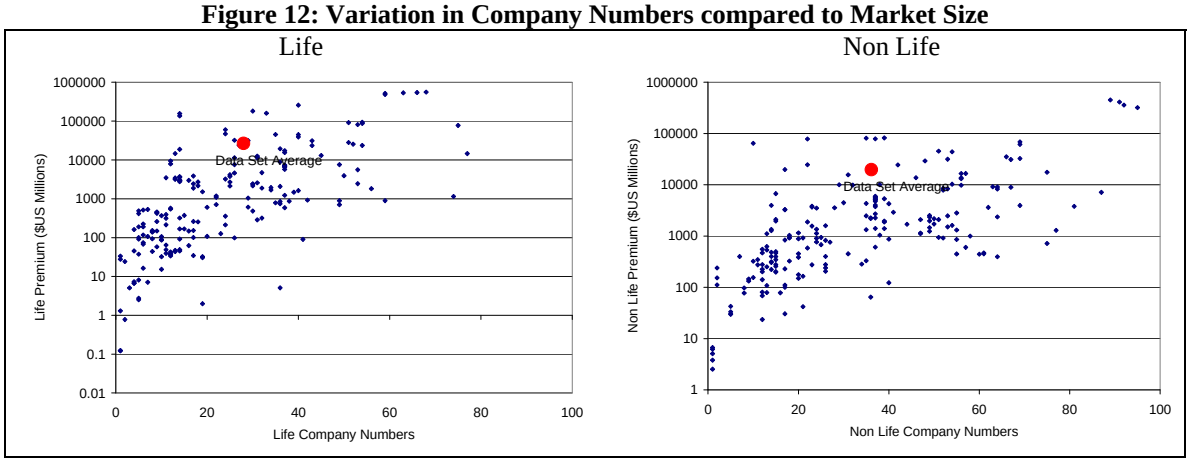
Figure 11: Variation in Company Numbers compared to Insurance Penetration



Source: Staff Analysis

Market size overall, in absolute terms, does paint a different picture. The expectation that larger markets do also see more participants is visible in the data set (see Figure 12). This adds further to the proposition that consideration of consolidation has to be measured against expectations of market growth. In effect, larger markets may be able to accommodate more participants.

Figure 12: Variation in Company Numbers compared to Market Size



Source: Staff Analysis

It is proposed to conduct further analysis in the area of numbers of market participants. Initial regression analysis was promising but is not ready for presentation at this stage until further work is completed.

Summary, Concluding Remarks and Next Steps

The presentation of the data has been prepared at this stage so as to assist in cross country benchmarking and interpretation of concentration measures in the insurance sector. This is motivated, in particular, because there is not a suitable reference available elsewhere of a similar nature.

The data set suggests that there is a valid hypothesis that can be brought to analysis of markets with respect to concentration and competition levels. The hypothesis that is supported contends that there is a natural level of competition in insurance markets that can be determined with reference to the market development stage and absolute size and that those markets that are above or below these levels will gravitate toward the more natural competitive position over time. The values proposed are indicative and provide a starting point for further discussion but have, to date, been validated with industry participants.

In summary, the paper proposes the following conclusions:

- Analysis of insurance markets and individual insurers is relevant as input to prudential processes, broader sector policy making, and for firms in strategic planning just to name a few potential uses. As part of such analysis, concentration and competition measures can be informative. The data set permits comparison of individual country measures against a more global set to provide some perspective to the interpretation of individual sector levels and to generate some hypotheses for further analysis regarding potential future dynamics;

- The average concentration measures are notably higher for life insurance than non life insurance. It is suggested that the explanation for this lies in the greater access to economies of scale for life insurance businesses and the tempering effect of needing to more carefully manage aggregation of risk in the non life sector;

- An initial proposition would be that a market where the concentration measures are above or below the more general level would be expected to gradually move toward this more natural level. Overall, the average for the data set suggests that a "natural level" for the Herfindahl Index around 2,250 for life insurers and 1,525 for non life insurers;

- For each country, it is then possible to adjust this level to reflect the absolute size of the market. Lower index values can be supported in larger markets by absolute size. This observation would be consistent with the view that adequate scale economies can be achieved through market size growth;

- Absolute market size can moderate the a priori conclusion that markets will consolidate and company numbers reduce. If markets are already large or are growing strongly then the pressure for consolidation is likely to be much weaker. Large markets appear able to sustain lower concentration and larger company numbers than small markets especially in the absence of expectations for growth; and

- Within jurisdictions, a similar analysis might be usefully pursued for sub-national markets or for separate product lines.

There is considerable opportunity for additional analysis of the data set. The planned work suggested is:

- continuing to build the data set with additional data points as they become available;

- continued validation through sector discussions;

- adding variables, for example,

    - minimum capital requirements to examine the impact of entry limitations; and
    - claims ratios and combined ratios for non life companies to enable comparison of trends in competition against profitability and price performance;

- Consideration to be given to the effects of regional market integration in the regression analysis; and

- more formal regression analysis of the data set, including differentiation between stages of economic development, additional variables, and comparisons between markets of differing characteristics.

Annex: The Herfindahl Index

In the data set, the Herfindahl Index has been calculated based on premium based market shares. That is:

Let $p_{j,t}$ be the premium for company *j* at time *t*.

The total market premium at time *t* will be $P_t = \sum_j p_{j,t}$

and

the Herfindahl Index is be defined as $H_t = \sum_j \left(\frac{p_{j,t}}{P_t} \right)^2$

The same approach could be taken to a number of other measures of market share such as assets or new business premium or to product or geographic regional subsets.

Annex: References

AXCO Database – for more information refer to www.axco.co.uk

Swiss Re *Sigma* (Various Years) available at www.swissre.com